CLAIMS

[1] A laminating apparatus for forming a laminate layer on a recording surface of a recording media comprising:

a press bonding unit for laying a laminate material having a size larger than the recording medium over the same and thermally press bonding them together; wherein

the laminate layer protruding outwards from the recording medium is transferred onto a transfer medium means disposed on the side of the surface of the recording medium opposite to the recording surface.

[2] The laminating apparatus according to claim 1, further comprising a separating unit for moving the recording medium with the laminate layer adhered thereon relatively away from the transfer medium means so as to separate the transfer medium means from the surface of the recording medium opposite to the recording surface.

[3] The laminating apparatus according to claim 2, wherein the transfer medium means is an under film.

[4] The laminating apparatus according to claim 2, wherein the press bonding unit comprises a pair of conveying members for conveying the recording medium while thermally press bonding the same, and one of the pair of conveying members disposed on the side of the surface of the recording medium opposite to the recording surface to be conveyed functions as the transfer medium means, as well as functioning as a transfer conveying member, on which the laminate layer is transferred when in thermally press bonding.

[5] The laminating apparatus according to claim 4, wherein the transfer conveying member comprises any one of a roller member and a belt member.

[6] The laminating apparatus according to any one of claims 4 and 5, further

comprising a removing means for removing the laminate layer transferred onto the transfer conveying member.

[7] The laminating apparatus according to any one of claims 4 and 5, wherein the transfer conveying member is detachably mounted to the press bonding unit.

[8] The laminating apparatus according to claim 2, wherein the laminate material is made up of a sheet-like substrate peelably laminated on the laminate layer, and the laminating apparatus further comprises a peeling-off unit for separating the laminate layer adhered onto the recording surface of the recording medium away from the substrate.

[9] The laminating apparatus according to claim 8, wherein the adhesive force of the laminate layer relative to the recording surface of the recording medium is set to be stronger than the adhesive force of the laminate layer relative to the substrate when the recording surface of the recording medium is laminated with the laminate layer.

[10] The laminating apparatus according to claim 1, wherein the transfer medium means is a film, and the laminate material and the transfer medium means each are cut into sheet-like pieces each having a size larger than the recording medium.

[11] The laminating apparatus according to claim 1, wherein the transferred width of the laminate layer transferred onto the transfer medium means is about 3 mm or larger.

[12] The laminating apparatus according to claim 1, further comprising a second press bonding unit in addition to the press bonding unit (first press bonding unit) for again carrying out the thermally press bonding.

[13] The laminating apparatus according to claim 8, further comprising a second press bonding unit for again carrying out the thermally press bonding for an intermediate with the substrate removed therefrom.

[14] The laminating apparatus according to claim 13, wherein the heating temperature and/or the press contact force at the second press bonding unit are set to be lower than the heating temperature and/or the press contact force at the press bonding unit (first press bonding unit).

[15] The laminating apparatus according to any one of claims 1 and 13, wherein the press bonding unit (first press bonding unit) and/or the second press bonding unit each comprise a pair of rollers for causing a press contacting effect, and at least one of each pair of rollers, which acts on the laminate layer, comprises a roller having a soft layer on a rigid roller surface.

[16] The laminating apparatus according to any one of claims 1 and 13, wherein the press bonding unit (first press bonding unit) and/or the second press bonding unit each comprise a pair of rollers for causing a press contacting effect, and at least one of each pair of rollers is formed into a drum-like shape having an outer diameter that is reduced as it advances from the center portion towards the opposite ends in the axial direction, and is designed to be elastically deformed by being urged.

[17] The laminating apparatus according to any one of claims 1 and 13, wherein the press bonding unit (first press bonding unit) and/or the second press bonding unit each are provided with a pair of press contacting means for causing a press contacting effect, wherein one of each pair of press contacting means, which acts on the laminate layer, has an acting surface having an uneven surface configuration.

[18] The laminating apparatus according to claim 1, further comprising a recording medium supplying unit for supplying recording media to the press bonding unit, and the recording medium supplying unit is designed to be capable of supplying the recording media towards the press bonding unit to have a precedent recording medium spaced with a given distance from a subsequent

recording medium.

[19] The laminating apparatus according to claim 1, further comprising a recording medium supplying unit for supplying recording media to the press bonding unit, and a laminate material supplying unit for supplying a laminate material along a first direction, wherein the laminate material has a length in the first direction longer than the length of each recording medium in the first direction and a length in a second direction orthogonal to the first direction longer than the length of each recording medium in a second direction orthogonal to the first direction, and the recording medium supplying unit is designed to be capable of supplying recording media towards the press bonding unit to have a precedent recording medium located substantially close to a precedent recording medium.

[20] The laminating apparatus according to claim 1, further comprising a recording medium supplying unit for supplying recording media to the press bonding unit, and a laminate material supplying unit for supplying a laminate material, wherein the laminate material has a length in a first direction longer than the length of each recording medium in the first direction and a length in a second direction orthogonal to the first direction being substantially equal to the length of each recording medium in a second direction orthogonal to the first direction, and any one of the recording medium supplying unit and the laminate material supplying unit is designed to be capable of supplying any one of the recording media and the laminate material so as to have the opposite ends of the laminate material in the second direction substantially matched to the opposite ends of each recording medium in the second direction.

[21] The laminating apparatus according to claim 20, wherein the laminate material supplying unit includes a storing means for storing the laminate material in such a manner as to be capable of supplying the same to the press bonding unit, and the storing means is designed to be capable of being replaced with a different

storing means that stores a laminate material having a length in the second direction corresponding to the length of each recording medium in the second direction, so as to correspond to the size of each recording medium supplied from the recording medium supplying unit.

[22] The laminating apparatus according to claim 21, wherein the storing means comprises a holder that axially supports the laminate material, which is lengthy in the first direction and is wound into a roll.

[23] The laminating apparatus according to claim 20, wherein the recording medium supplying unit and the laminate material supplying unit are designed to be capable of respectively supplying the laminate material and the recording media towards the press bonding unit so as to bring the first direction of the laminate material and the recording media into the supplying direction thereof, and a limiting guide is provided at least on the upstream side of the press bonding unit so as to guide the opposite ends of each of the laminate material and each recording medium in the second direction, thereby limiting the movement of each of the laminate material and the recording media in the second direction.

[24] The laminating apparatus according to claim 3, wherein the press bonding unit comprises a pair of conveying members for conveying each recording medium while thermally press bonding the same, and has a preheating section that preheats at least one of the laminate material and the under film prior to thermally press bonding.

[25] The laminating apparatus according to claim 24, wherein at least one of the pair of conveying members is any one of a roller member and a belt member that is heated for thermally press bonding and has a surface moving for the conveyance, and any one of the laminate material and the under film or at least one of the laminate material and the under film, which is disposed on the side of any one of the roller member and the belt member, is partially wound around any

one of the roller member and the belt member so as to provide a preheat area having a given width on the upstream side of a thermally press bonding point in a surface moving direction of any one of the roller member and the belt member and to be preheated at the preheat section.

[26] The laminating apparatus according to claim 25, further comprising a free roller that is rotatably disposed corresponding to the member to be heated, of the conveying members, in an area capable of being influenced by heat from the member to be heated, wherein any one of the laminate material and the under film or at least one of the laminate material and the under film is wound around the free roller so as to be further preheated by the free roller influenced by heat from the member to be heated, prior to thermally press bonding.

[27] The laminating apparatus according to claim 3, wherein the press bonding unit comprises a pair of conveying members that convey recording media while thermally press heating the same, and a free roller that is disposed on the upstream side of the pair of conveying members and is designed to be heated, wherein the laminate material and/or the under film are wound around the free roller prior to thermally press bonding.

[28] The laminating apparatus according to claim 27, wherein at least one of the pair of conveying members is designed to be heated for thermally press bonding, and the free roller is disposed in an area capable of being influenced by heat from the at least one of the pair of conveying members so as to be heated.

[29] The laminating apparatus according to claim 27, wherein the free roller has a surface layer on the surface of a roller body, which surface layer having a higher heat absorptivity than the roller body.

[30] The laminating apparatus according to claim 2, wherein the separating unit is designed to move each recording medium with the laminate layer adhered thereon relatively away from the transfer medium means upon elapse of a given

time after thermally press bonding at the press bonding unit.

[31] The laminating apparatus according to claim 1, further comprising a forcibly cooling means for cooling each laminate formed by thermally press bonding at the press bonding unit.

[32] The laminating apparatus according to claim 31, further comprising a conveying passage for conveying each laminate formed by thermally press bonding at the press bonding unit, wherein the conveying passage is defined by a guide member for guiding each laminate, and the guide member has a heat releasing property so as to constitute the forcibly cooling means.

[33] The laminating apparatus according to claim 2, further comprising a guide member that is disposed upstream of a separating point of the separating unit, at which a laminated portion is separated from a non-laminated portion, so as to limit the movement of the laminated portion and the non-laminated portion in a direction crossing a first direction in the upstream side of the separating point.

[34] The laminating apparatus according to claim 2, further comprising a guide member that is disposed corresponding to a separating point of the separating unit at which a laminated portion is separated from a non-laminated portion and its proximity, so as to limit the movement of the laminated portion at the separating point and its proximity, in a direction opposite to the moving direction of the non-laminated portion which moves in the downstream side of the separating point.

[35] The laminating apparatus according to claim 2, further comprising a guide member that is disposed between an upstream side and a downstream side, of the separating unit, straddling over a separating point of the separating unit, at which a laminated portion is separated from a non-laminated portion, so as to limit the movement of the laminated portion and the non-laminated portion in a

direction crossing a first direction in the upstream side of the separating point, and limit the movement of the laminated portion at the separating point and its proximity in a direction opposite to the moving direction of the non-laminated portion which moves in the downstream side of the separating point.

[36] The laminating apparatus according to claim 8, wherein the separation of the transfer medium means is carried out after the peeling-off of the substrate.

[37] The laminating apparatus according to claim 8, wherein the peeling-off of the substrate is carried out after the separation of the transfer medium means.

[38] The laminating apparatus according to claim 8, wherein the separation of the transfer medium means and the peeling-off of the substrate are substantially simultaneously carried out.

[39] The laminating apparatus according to claim 2, wherein the speed at which the transfer medium is separated is lowered for at least a leading edge side of the leading edge side and a tailing edge side, of each recording medium in a direction along which the transfer medium means is separated.

[40] The laminating apparatus according to claim 39, which is adapted to carry out the thermally press bonding and separating while conveying the recording media, wherein the speed at which the transfer medium means is separated is lowered for the leading edge side and the tailing edge side, of the recording medium by temporarily lowering the speed at which the recording media are conveyed.

[41] The laminating apparatus according to claim 40, wherein sensors for detecting the leading edge and the tailing edge, of the recording medium are disposed at given positions in the upstream and downstream sides of the separating point in a conveying direction of the recording media, so as to change the conveying speed for the recording media.

[42] The laminating apparatus according to claim 8, wherein the speed at

which the substrate is peeled off is lowered for at least a leading edge side of the leading edge side and a tailing edge side, of the recording medium in a direction along which the substrate is peeled off.

[43] The laminating apparatus according to claim 42, which is adapted to carry out the thermally press bonding and peeling-off while conveying the recording media, wherein the speed at which the substrate is peeled off is lowered for the leading edge side and the tailing edge side, of the recording medium by temporarily lowering the speed at which the recording media are conveyed.

[44] The laminating apparatus according to claim 43, wherein sensors for detecting the leading edge and the tailing edge, of the recording medium are disposed at given positions in the upstream and downstream sides of the peeling-off point in a conveying direction of the recording media, so as to change the conveying speed for the recording media.

[45] The laminating apparatus according to claim 2, wherein the transfer medium means is a sheet-like transfer medium material, and the separating unit is designed to separate the transfer medium material from the recording medium in an oblique direction.

[46] The laminating apparatus according to claim 45, which is adapted to carry out the thermally press bonding, transferring and separating while conveying the recording media, the laminate material and the transfer medium material, wherein the recording media are supplied in a direction obliquely to the conveying direction, and the transfer medium material is separated in a direction parallel to the conveying direction.

[47] The laminating apparatus according to claim 45, which is adapted to carry out the thermally press bonding, transferring and separating while conveying the recording media, the laminate material and the transfer medium material, wherein the recording media are supplied in a direction parallel to the conveying

direction, and the transfer medium material is separated in a direction obliquely to the conveying direction.

[48] The laminating apparatus according to claim 47, wherein the separating is carried out via a lengthy separating guide member that is disposed along a width direction with respect to the conveying direction and has an edge inclined to the width direction with respect to the conveying direction.

[49] The laminating apparatus according to claim 2, wherein the transfer medium means is a sheet-like transfer medium material, and the separating unit is designed to separate the transfer medium material towards the side of a surface of the recording medium opposite to the recording surface via a lengthy separating guide member that is disposed along a width direction with respect to the conveying direction, and an edge of the separating guide member is formed into a non-linear shape.

[50] The laminating apparatus according to claim 2, wherein the separating unit is provided with a guide member that is disposed in proximity and downstream of a separating point in the conveying direction of the recording media, at which separating point the surface of the recording medium opposite to the recording surface is separated from the transfer medium means, and the guide member has at least an upstream end disposed offset away from the conveying passage of the recording media of the upstream side of the guide member in a direction along which the transfer medium means is separated.

[51] The laminating apparatus according to claim 2, wherein the separating unit is provided with a guide member that is disposed in proximity and downstream of a separating point in the conveying direction of the recording media, at which separating point the surface opposite to the recording surface of the recording medium is separated from the transfer medium means, the guide member has a first guide surface that extends in the conveying direction, and a

second guide surface that is inclined at an oblique angle relative to the first guide surface towards the side opposite to the recording surface from the side of the separating point of the first guide surface, and the second guide surface of the guide member has an upstream end disposed offset away from the conveying passage of the recording media in the upstream side of the guide member, in a direction along which the transfer medium means is separated.

[52] The laminating apparatus according to claim 1, further comprising a laminate material supplying unit that supplies the laminate material having a substrate peelably laminated on the laminate layer from a roll as a continuous sheet onto the recording surface of the recording medium, and for the roll of the laminate material in the laminate material supplying unit, a roll with the laminate layer wound thereinto to have the laminate layer facing inwardly is used.

[53] The laminating apparatus according to claim 52, further comprising a peeling-off unit for peeling off the substrate from the laminate layer of the laminate material, and a collecting unit for collecting the peeled substrate by winding it into a roll to have a side of the substrate, on which the laminate layer has been laminated, facing inwardly.

[54] The laminating apparatus according to claim 1, further comprising a laminate material supplying unit that successively supplies a lengthy laminate material, wherein the press bonding unit is designed to be capable of being switched between a press bonding mode and a non-press bonding mode, and the laminate material supplied by a given feeding length under the non-press bonding mode can be pulled back into the laminate material supplying unit.

[55] The laminating apparatus according to claim 54, wherein the transfer medium means is a lengthy under film, the apparatus further comprises an under film supplying unit that successively supplies the under film and is so structured that the under film, which has been supplied under the non-press bonding mode,

can be pulled back into the under film supplying unit by a given feeding length along with the pulling back of the laminate material.

[56] The laminating apparatus according to claim 54, wherein the press bonding unit does not contact the supplied laminate material under the non-press bonding mode.

[57] The laminating apparatus according to claim 56, further comprising a roller that is disposed between the laminate material supplying unit and the press bonding unit and controls so that the press bonding unit does not contact the supplied laminate material when the press bonding unit is held in the non-press bonding mode.

[58] The laminating apparatus according to claim 1, which has the press bonding unit mounted in a housing and is adapted to form the laminate layer on the recording surface of the recording medium, wherein the housing is capable of being freely opened and closed, and the apparatus further comprises a locking means that prevents the housing from being opened when the press bonding unit is at a given temperature or higher.

[59] A laminating method of forming a laminate layer on a recording surface of a recording medium, comprising:

laying a laminate material having a size larger than the recording medium over the same and thermally press bonding them together; and

transferring the laminate layer protruding outwards from the recording medium onto a transfer medium means that is disposed on the side of the surface of the recording medium opposite to the recording surface.

[60] The laminating method according to claim 59, wherein the transfer medium means is moved towards the side of the recording medium opposite to the recording surface and separated so as to cut a laminated portion having the laminate layer adhered onto the recording surface away from a non-laminated

portion having the laminate layer adhered onto the transfer medium means.

[61] The laminating method according to claim 60, wherein the laminate material having a sheet-like substrate peelably laminated to the laminate layer is used and the substrate is peeled off from the laminate layer of the thermally press bonded laminate material.

[62] The laminating method according to claim 59, wherein the transferred width of the laminate layer transferred onto the transfer medium means is about 3 mm or larger.

[63] The laminating method according to claim 59, wherein thermally press bonding is again carried out after the thermally press bonding.

[64] The laminating method according to claim 61, wherein thermally press bonding is again carried out after the substrate has been peeled off from the laminate layer of the thermally press bonded laminate material.

[65] The laminating method according to claim 59, wherein plural recording media are successively supplied so as to have a precedent recording medium spaced with a given distance from a subsequent recording medium, and are thermally press bonded.

[66] The laminating method according to claim 59, wherein the laminate material having a length in a first direction longer than the length of each recording medium in a first direction and having a length in a second direction orthogonal to the first direction longer than the length of each recording medium in a second direction orthogonal to the first direction is used, and the recording media and the laminate material are supplied in the first direction while having a precedent recording medium kept substantially close to a subsequent recording medium and are thermally press bonded.

[67] The laminating method according to claim 59, wherein the laminate material having a length in a first direction longer than the length of the recording

medium in a first direction and having a length in a second direction orthogonal to the first direction substantially equal to the length of the recording medium in a second direction orthogonal to the first direction is used, and the recording media and the laminate material are supplied so as to have the opposite ends of the laminate material in the second direction matched to the opposite ends of the recording medium in the second direction and are thermally press bonded.

[68] The laminating method according to claim 60, wherein an under film is used as the transfer medium means, and at least one of the laminate material and the under film is preheated prior to the thermally press bonding.

[69] The laminating method according to claim 60, wherein the transfer medium means is separated upon elapse of a given time after the thermally press bonding.

[70] The laminating method according to claim 61, wherein the separating step of the transfer medium means is carried out after the peeling-off step of the substrate.

[71] The laminating method according to claim 61, wherein the peeling-off step of the substrate is carried out after the separating step of the transfer medium means.

[72] The laminating method according to claim 61, wherein the separating step of the transfer medium means and the peeling-off step of the substrate are substantially simultaneously carried out.

[73] The laminating method according to claim 60, wherein the speed at which the transfer medium means is separated is lowered for at least a leading edge side of the leading edge side and a tailing edge side of the recording medium in a separating direction of the transfer medium means.

[74] The laminating method according to claim 61, wherein the speed at which the substrate is peeled off is lowered for at least a leading edge side of the leading

edge side and a tailing edge side of the recording medium in a peeling-off direction of the substrate.

[75] The laminating method according to claim 60, wherein a sheet-like transfer medium material is used as the transfer medium means and the transfer medium material is moved away from the recording medium in a direction obliquely thereto.